Appendix A

Int. Cl.: 6

Prior U.S. Cl.: 14

United States Patent and Trademark Office

10 Year Renewal

Reg. No. 269,898

Registered Apr. 22, 1930

Renewal Approved Apr. 2, 1990

TRADEMARK
PRINCIPAL REGISTER

HASTELLOY

HAYNES INTERNATIONAL, INC. (DELAWARE CORPORATION)
P.O. BOX 9013
1020 W. PARK AVENUE
KOKOMO, IN 469049013, ASSIGNEE BY MESNE ASSIGNMENT AND CHANGE OF NAME HAYNES STELLITE COMPANY, THE (INDIANA CORPORATION) KOKOMO, IN

THE LINES ON THE DRAWING DO NOT INDICATE COLOR, BUT ARE FOR SHADING PURPOSES ONLY.

FOR: METAL ALLOYS, IN CLASS 14 (INT. CL. 6).

FIRST USE 3-15-1929; IN COMMERCE 3-15-1929.

SER. NO. 71-292,933, FILED 11-26-1929.

In testimony whereof I have hereunto set my hand and caused the seal of The Patent and Trademark Office to be affixed on May 15, 1990.

COMMISSIONER OF PATENTS AND TRADEMARKS

Amendment

Registered April 22, 1930 Registration No. 269,898

The Haynes Stellite Company

Application to amend having been made by Union Carbide Corporation, owner of the registration above identified, the drawing is amended to appear as follows:

HASTELLOY

Such amendment has been entered upon the records of the Patent Office and the said original registration should be read as so amended.

Signed and sealed this 10th day of March 1964.

[SEAL]

HORACE B. FAY, JR.,
Assistant Commissioner of Patents.

Registered Apr. 22, 1930

Trade-Mark 269,898

UNITED STATES PATENT OFFICE

THE HAYNES STELLITE COMPANY, OF KOKOMO, INDIANA

ACT OF FEBRUARY 20, 1905

Application filed November 26, 1929. Serial No. 292,933.

STATEMENT

To the Commissioner of Patents:

The Haynes Stellite Company, a corporation duly organized under the laws of the State of Indiana, and having a place of business in Kokomo, county of Howard, and State of Indiana, has adopted and used the trade-mark shown in the accompanying drawing, for METAL ALLOYS, in Class 14, Metals and metal castings and forgings, and presents herewith five specimens showing the trade-mark as actually used by it upon the goods, and requests that the same be registered in the United States Patent Office in accordance with the act of February 20, 1905, as amended.

The trade-mark has been used continuously in the business of said corporation on the goods specified since about March 15, 1929, as to the word "Hastelloy" and October 30, 1929, as to the combined mark as shown.

The lines on the drawing do not indicate color, but are for shading purposes only.

The trade-mark is applied to the packages for the goods or to tags to be affixed to the goods by stamping or printing the mark thereon.

Dated December 30, 1929.

[L. S.] THE HAYNES STELLITE COMPANY,
By A. C. CORNELL,
Secy.

Registered Jan. 8, 1946

Trade-Mark 418,698

UNITED STATES PATENT OFFICE

E. I. du Pont de Nemours and Company,
Wilmington, Del.

Act of February 20, 1905

Application February 10, 1945, Serial No. 479,666

TEFLON

STATEMENT

To all whom it may concern:

Be it known that E. I. du Pont de Nemours and Company, a corporation organized and existing under and by virtue of the laws of the State of Delaware and located and doing business in the city of Wilmington, county of New Castle, in said State, at No. 101 West Tenth Street, has adopted and used the trade-mark shown in the accompanying drawing, for SYNTHETIC RESINOUS FLUORINE-CONTAINING POLYMERS IN THE FORM OF MOLDING AND EXTRUDING COMPOSITIONS, FABRICATED SHAPES—NAMELY, SHEETS, RODS, TUBES, TAPE, AND FILAMENTS—SOLUTIONS, AND EMULSIONS, in Class 1, Raw or partly prepared materials.

This trade-mark has been used continuously in the business of said corporation since October 9, 1944.

The trade-mark is applied to the cans or containers or cases containing the same by placing thereon or affixing thereto a printed label or tag on which the trade-mark is shown, or by stamping, painting, stenciling, or otherwise reproducing thereon the trade-mark.

E. I. DU PONT DE NEMOURS
AND COMPANY,
By J. W. McCOY,
Vice-President.

Partial List of Trademarks

Partial List of Trademarks

The following is a partial list of trademarks which may appear from time to time in patent applications. Proper usage of trademarks requires that they be capitalized at all times. See MPEP § 608.01(v).

Any questions by the examiners as to whether an apparent trademark is in fact a registered trademark or to what particular goods a registered trademark applies should be referred to the Trademark Search Branch (308-9800) for determination.

Trademark

Particular goods on or in connection with which the trademark is used

ACE

Elastic bandages, adhesive bandages, adherent compounds for attaching surgical dressings or bandages to the skin, and bandage fastening clips

ACTIONWEAR

Men"s, women"s, children"s, and infants" garments - namely coats, sweaters, blouses, shirts, underwear, and sleepwear

ADRENALIN

Hemostatic, astringent, blood-pressure raising and stimulating preparations for medicinal or surgical purposes

AEROJET

Thrust motors whose general purpose is to provide thrust by means of a combustion process, and includes all the component parts of such motors

AEROSOL

Wetting agents for use in reducing the interfacial tension between liquids and solids or between two immiscible liquids

AIRVEYOR

Conveyors for conveying and handling materials

ANCHOR

Metallic fencing and related components

ARNEL

Yarns; textile fibers, including staple fibers and continuous filaments

BARBIE

Doll; accessories for doll

BEEF STICK

Summer sausage

BIRKENSTOCK

Footwear-namely, sandals, shoes, and shoe insoles

BLUSH

Wines

BOOGIE

Surfboards

BUSS

Electric fuses, fuse holders, fuse wire, and protectors for electric circuits that include fuse links and thermal cutouts and that respond to heavy overloads or short circuits to open the circuits

BUTTERFLY

Medical infusion sets for administration of fluids

CALGON

Water softening and water conditioning for industrial, laundry, and semi-industrial use

CALROD

Electrical resistance heaters; electrical resistance heating elements for cooling devices

CARBORUNDUM

Electrical devices comprising detectors for radio apparatus, resistance rods, lightning arrestors, resistors, and resistor units

CARBORUNDUM

Crystalline substance used as an abradant and for other purposes

CAROUSEL

Photographic projectors

CAT

Machinery for earth moving, earth conditioning, and material handling, namely, loaders and engines therefor, and parts for the foregoing; vehicles and internal combustion engines for earth and material hauling and handling, namely tractors and engines therefor, and parts for the foregoing

CATERPILLAR

Tractors, engines, treads, etc.

CHAP STICK

Medicinal preparation for chapped skin, sunburn, and hangnails

CLOROX

Household cleanser compositions, laundry detergent

COCA-COLA

Beverages and syrups for the manufacture of such beverages (carbonated soft drink)

COCOA-PUFFS

Ready to eat breakfast cereal

COKE

Nonalcoholic, maltless beverages and the syrups for making such beverages

COREX

Thermosetting plastic in the nature of a paint converted by heat into an insoluble, unfusible film

CRAWLER

Children"s play clothes, namely, overalls, shirts, rompers, and sunsuits

CYCLONE

Seeders and planters

DACRON

Yarns of synthetic fibers; synthetic polyester fibers for generalized use in the industrial arts

DORITOS

Corn chips, potato chips, tortilla chips, pretzels, and nut meats

FEDEX

Shipping containers in the nature of document envelopes, boxes and tubes; pick-up, transportation, storage, and delivery of documents, packages and freight by land and air

FIBERGLAS

Inorganic material in a fibrous condition or in the form of a loose mass of filaments or fibers

FLEXWOOD

Fabric-backed wood veneer

FLYING SAUCER

Toys, namely model airplanes and aerodynamic flying discs

FOAMICIDE

Chemical composition for addition to foaming liquids present in bottle and container washing processes and in industrial chemistry processes, to prevent the formation of foam therein

FOOTLETS

Anklets, knee-hi socks, hosiery, and footsocks

FORMICA

Laminates and solid surfacing materials in the form of slabs made predominantly of plastic for use in the manufacture of countertops, vanity tops, tabletops, sinkbowls, bath tubs, wall paneling, flooring, and furniture

GLAD

Plastic bag holders

GLAD LOCK

Plastic bags for packaging, such as food storage and freezer bags

HACKY SACK

Footbags used in a kicking game; conducting kicking game tournaments and kicking game instructional clinics

HI-LITER

Marking pens

INTERNET

Communication services, namely providing electronic data transmission services in the electronic banking field and retail marketing field

INTERNET

Carpeting installation information exchange and consulting services rendered by computer

INTERNET TELEVISION

Distribution and production of broadcast and nonbroadcast television programs, videotaped programs and audio tapes

IRONCLAD

Storage-battery plates

JARLSBERG

Cheese

JEEP

Automobiles and structural parts thereof

JELL-O

A compound used in the preparation of (jellies) desserts (pastries and ice-cream); gelatin dessert

JELLO-LIGHT

Pudding

JET SKI

Boats, recreational watercraft, floor mats, clothing, paint for machinery, tarpaulins, used to hold down boat covers; straps, namely boat covers and boat towing lines, motor oil, duffle bags

KARMELKORN

Popcorn candy, seasoned popcorn, cheese-covered popcorn, and popcorn balls each of which is made from popped popcorn; and also unpopped popcorn, candy, candied apple, nuts, and ice cream

KEVLAR

Man-made fibers for generalized use in the industrial arts

KITTY LITTER

Ground clay used for litters for small animals, i.e., cats, rats, mice, hamsters

KLEENEX

Absorbent tissue suitable for cleaning, hygienic, and cosmetic purposes, and paper towels

KOOSH

Tossing balls

LIFE SAVERS

Chewing-gum, candy, sweetmeats, and confections

LINOTYPE

Typesetting machines and parts thereof; accessories and equipment for use with typeset machines and systems - namely, line printers, video terminals, keyboards, tape perforators, tape readers, graphic scanners, optical character readers and computer programs

LIQUID PAPER

Office supply products, namely correction fluid, error correction tapes

LISTSERV

Computer software for managing electronic mailing lists

LOAFERS

Ladies", men"s, and boys" shoes made of leather, rubber, fabric, and various combinations of such materials

LUCITE

Enamel and paint

LYCRA

Synthetic fibers and filaments for generalized use in the industrial arts

MINI BAR

Small-sized pry bars

MONOTYPE

Type casting and composing machines, including keyboards and casting-machines and repair parts and supplies therefor; paper ribbons or controllers for type casting and composing machines; photo typesetting machines utilizing cameras and laser beam, and structural parts thereof, typefaces, typefonts and type designs of alphanumeric characters and/or typographical symbols recorded as visible images in printer"s type

MUSIC BY MUZAK

Planned music service for transmitting specially programmed background music to stores, restaurants, homes, hotels, banks, railroads, airlines, boats, transportation terminals, factories and other industrial and commercial establishments throughout the U.S.

MYLAR

Flexible film for packaging purposes; polyester film

OILGEAR

Valves for use in and in connection with the hydraulic transmission of power

ORLON

Synthetic fiber-forming polymers and copolymers of acrylic acid or its derivatives produced in the form of fibers for further use in the industrial arts

PAMPERS

Disposable diapers

PARA-SAIL

Parachutes

PERF-A-TAPE

Paper tape for sealing composition board joints

PERMALLOY

Metal hardening agent sold as a component part of machine parts; namely, sheaves, drill steels, barrel rollers, and pins for mining machinery such as drag line conveyors and drills

PIZZA ROLLS

Pasta snacks, namely hamburger flavor pasta snacks, cheeseburger flavor pasta snacks, pepperoni and cheese flavor pasta snacks, sausage, and cheese flavor pasta snacks, and shrimp and cheese flavor pasta snacks

POPSICLE

Frozen confections on sticks and liquid flavoring concentrates for making said confections

POST-IT

Stationary notes containing adhesive on one side for attachment to surfaces

PYREX

Beakers, flasks, test tubes, etc.; glass

QUICKEN

Computer software programs and user documentation supplied therewith

Q-TIPS

Absorbent swabs and balls for toiletry, medical, and cosmetic uses; swabs consisting of small sticks of wood or paper having wads of cotton twisted about one or both ends, intended for use primarily as a cosmetic aid

RICE KRISPIES

Cereal breakfast food

RIPPLE

Wines

ROLLERBLADE

Boots equipped with longitudinally aligned rollers used for skating and skiing

ROQUEFORT

Cheese

SANKA

Coffees and teas, coffee and tea extracts, both dry and liquid, and tea and coffee substitutes

SCOTCH

Masking tape, cellophane tape, acetate fiber tape and other pressure-sensitive adhesive tapes; liquid adhesive, adhesive sheet material, an adhesive coated sheet material in sheet or strip form; adhesive tape

SNAP-ON

Sharpening stones, nail clipper; calibrated rulers, magnetic paper clips, magnetic tape holders, drill bit gauges, tape measurers; tools and machinery

SNOOZ-ALARM

Electronic repeat alarm timer sold as a component of alarm clocks; clocks

SPEED NUT

Nuts

SPERRY TOP-SIDER

Boating coats, boating hats, boating suits, boating jackets, boating shirts and boating trousers, footwear

STELLITE

Metal alloys

STELLITE

Rivet setting tools

SWOOSH

Footwear

TABASCO

Pepper sauce

TALON

Thread

TEFLON

Synthetic resinous fluorine-containing polymers in form of molding and extruding compositions, fabricated shapes-namely, sheets, [rods] tubes, tape and filaments [-solutions,] and emulsions; polytetrafluoroethylene coatings in the nature of paints and varnishes

TELEMARKETING INC.

Telephone marketing consulting services; conducting telephone sales campaigns for business clients

TELETYPE

Printing-telegraph apparatus

TELEX

Equipment and apparatus for electronic treatment of sound-namely, sound recorders-reproducers, phonographs, tape decks, tape recorders, tape cartridge players, tape duplicators, tapes for sound recording and reproduction, combination tape recorders and radios, and combination phonographs-tape decks, and components and parts for all of said equipment

THERMOS

Temperature-retaining vessels; double-walled glass vessels with vacuum between the walls

TOLL HOUSE

Prepared edible chocolate

TOUCH-TONE

Musical instruments, mainly timpani and other drums, malletsfor playing drums, and other percussion instruments and parts thereof

TRAV-O-LATER

Endless conveyors

TRIGGER

Indicating tripping fuses

TROUT CHOW

Feed for fish

TWIST-LOCK

Electrical wiring apparatus, namely electric flush receptacles, attachment plug, caps, cord-coupling, caps, couplings, connectors, motor couplings, attachment plugs, and motor plugs

TYVEK

Fabrics of man-made fibers and filaments suitable for making into household furnishings and apparel and for industrial uses

VASELINE

Emollient and medicinal preparation for external and internal use; petroleum jelly, oil petrol, white mineral oil; moisturizing lotion and cream

VELCRO

Notion - namely, a synthetic material sold in ribbon, sheet, or piece goods form, said material having complemental parts which adhere to each other when pressed together and adapted for use as a closure fastener, or button for closing garments, curtains, or the like; separable fasteners-namely, hook and loop-type fasteners and components thereof

VICTROLA

Prerecorded audio cassettes; records for talking-machines

VIDEOFILE

Document storage systems designed to automate the storage andretrieval of document images, and components thereof

VIENNA BEEF

Tongue, corned beef, frankfurters, wieners, knockwurst, polish sausage, pastrami,

salami, and bologna

VISE-GRIP

Hand tools and instruments, namely pliers and workholding clamps with or without a cutting edge, wrenches, wrenches with a wire cutter and welding clamps, and sheet metal bending tool

VOTATOR

Machinery for processing and handling materials in fluid, plastic, or particulate form including food products

WEATHER-OMETER

Apparatus for testing the effect of weather upon the surface of objects

WEED EATER

Machinery for edging and trimming vegetation; weed and grass cutting machinery for edging and trimming lawns

WIFFLE

Simulated or auxiliary pliable plastic baseballs and a game played therewith

WINDBREAKER

Men"s, young men"s, boys", women"s, misses" and girl"s apparel for sportswear, dress wear, work wear, and uniforms; namely jackets, vests, trousers, suits, shirts, blouses

WINDOWS

Cartridges containing software for operating or enhancing the operation of laser printers, which cartridges are to be inserted into the printers, and accompanying software for installation in computers which communicate with the printers; computer programs and manuals sold as a unit; namely graphical operating environment programs for microcomputers

WINDSURFER

Sailboats having a free sail system

WITE-OUT

Typing and drawing correction fluid (erasing liquid)

XEROX

Electrophotographic copying machines (and equipment for recording x-ray images - namely, processors for electrostatically charging xeroradiographic plates and conditioners for producing positive or negative prints)

ZIPLOC

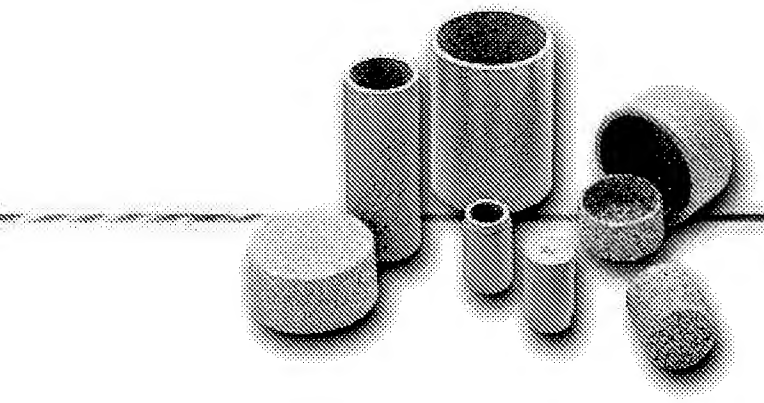
Plastic bags

KEY: =online business system =fees =forms =help =laws/regulations =definition (glossary)

The **Inventors Assistance Center** *is available to help you on patent matters.Send questions about USPTO programs and services to the* **USPTO Contact Center (UCC).** *You can suggest USPTO webpages or material you would like featured on this section by E-mail to the* **webmaster@uspto.gov**. *While we cannot promise to accommodate all requests, your suggestions will be considered and may lead to other improvements on the website.*

Appendix B

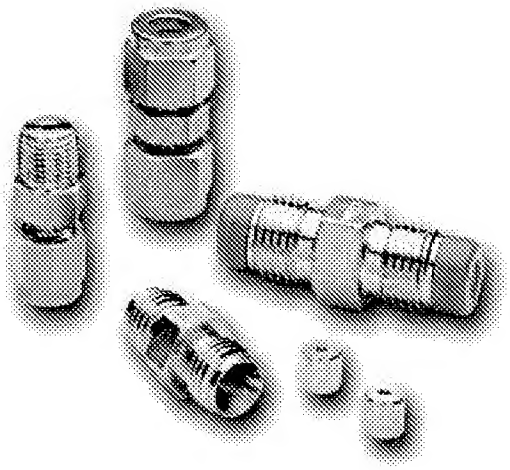
mott *corporation*
Porous Metal Products

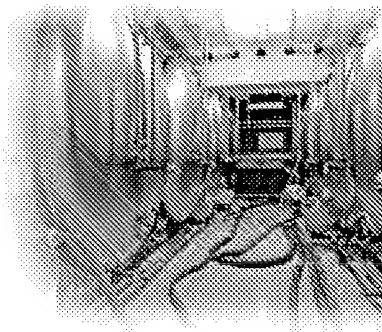


Porous metal solutions.

Filtration, flow control, sparging, dispersion and shapes of porous metal.

Absolutely reliable, any way you can imagine.





Mott porous metal media. The high-strength, high-performance choice for permeable designs.

Whether you're flowing gas or liquid, Mott porous metal is the proven, reliable, long-lasting media for efficient particle capture, flow restriction, wicking and gas/liquid contacting. For decades, users of alternative media such as fabric- and polymer-based filters have switched over to Mott for the distinct advantages that Mott porous metal provides:

Long life – In most applications, Mott porous metal maintains high filtration efficiency and structural integrity through years of continuous use.

High strength – Mott media is unsurpassed in tensile strength, making it well suited for high differential pressures and flow rates.

Uniform porosity – A strictly controlled sintering process enables Mott to produce uniformly sized and distributed pores, in media grades ranging from 0.1 to 100.

Fully cleanable – Particles may be removed from Mott media using backpulse and other cleaning methods, restoring the media to its original efficiency for repeated performance.

No media migration – "Solid-state diffusion bonding" holds filter media together at the molecular level, making it virtually inseparable, even under the harshest conditions.

	Maximum Temperature	
Material	**Oxidizing Atmosphere**	**Reducing Atmosphere**
316L SS	750°F/399°C	900°F/482°C
Hastelloy® C-276	850°F/454°C	1000°F/538°C
Inconel® 600	1100°F/593°C	1500°F/815°C
Hastelloy® X	1450°F/788°C	1700°F/927°C

High heat tolerance – All-metal construction and welded joints and seams endure high temperatures, even in the midst of oxidizing atmospheres.

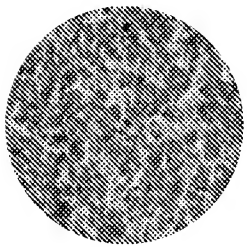
Wide choice of materials – In addition to 316L stainless steel – Mott's standard material of construction – customers may choose from many other metals and alloys to meet special requirements such as greater temperature and corrosion resistance:

- Stainless Steel; 316L, 304L, 310, 347 and 430
- Hastelloy C-276, C-22, X, N, B and B2
- Inconel 600, 625 and 690
- Nickel 200 and Monel® 400 (70 Ni-30 Cu)
- Titanium
- Alloy 20
- Many others – Consult factory

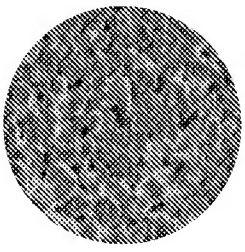
Precise manufacturing helps control a variety of performance characteristics.

Controlling the physical characteristics of Mott media results in still more benefits – controlled performance. By altering shape, porosity, material of construction, and many other factors, Mott can provide complete functional control over a wide range of properties including:

- Mean pore size
- Capillary attraction
- Surface characteristics
- Thermal conductivity
- Density
- Particle size retention
- Mechanical properties
- Permeability



Media Grade 0.2 (x100)



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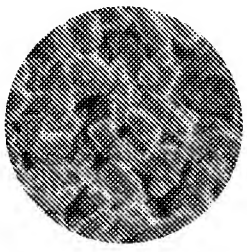
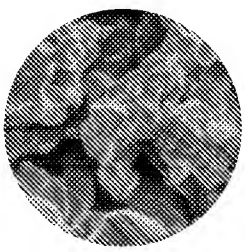
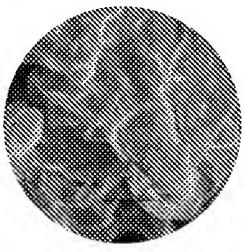


Media Grade 5 (x100)



Media Grade 20 (x100)



Media Grade 100 (x100)

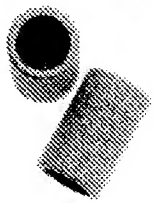
Manufacturing methods for the highest quality and consistency.

Mott porous metal fabrication begins with pregrading the metal powders using precise particle size distributions. Powders are then compressed into desired shapes – a process which reduces or eliminates the need for post-sintering shaping and forming, while providing additional benefits:

- Precise dimensional control
- More uniform porosity by reducing the number of oversized pores
- Improved permeability and density control
- Higher strength by increasing the number of bonds between adjacent particles

Precompressed metal powders are then sintered in controlled atmosphere furnaces at temperatures approaching the melting point for the specific alloy being used. The controlled atmosphere heating process reduces surface oxide films from powder particles, and promotes the formation of strong bonds between the particles.

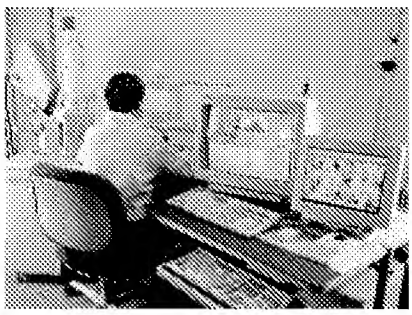
From start to finish of the manufacturing cycle, Mott technicians apply stringent control of processing variables such as compacting pressure, sintering time, temperature and atmosphere, resulting in precise control of density, permeability, and pore size. Lots are checked for permeability uniformity, pore size uniformity, carbon content, corrosion resistance, and chemistry. The result is consistent, reproducible quality – available only with Mott porous metal media.



Research and Development.

The Mott R&D Laboratory maintains a complete development and testing facility for the practical evaluation of porous metal. Research and development work involves the constantly evolving filtration technology, and other flow control applications for a broad range of process needs. This capability is an important part of our customer support program, enabling us to prove the operation and cost effectiveness of the products or systems we offer.

Universal tensile machine.



Scanning electron microscope (SEM).

Our laboratory contains a wide array of analytical equipment to support new product development, customer sample testing and system troubleshooting. Our capabilities are supported by equipment such as:

- Metallographic equipment
- Microhardness tester
- Scanning electron microscope
- Energy dispersive x-ray analyzer
- Image analysis system
- Universal testing system
- Porometers
- Horiba particle size analyzer
- Condensation nucleus counters
- Laser particle counters
- Liquid particle counters
- Particle classifier
- Aerosol monitors
- Bench and pilot scale liquid filtration test equipment with data acquisition and control capability

Particle size analyzer.

Primary design considerations.

All porous products, whatever the material of construction, have specific properties which must be taken into account in design and manufacturing processes. Proper attention to these characteristics will help control costs in manufacturing, while at the same time, produce the best combination of properties and performance.

In order to select the best media for any application, one should be able to provide Mott with the following information:

Primary application considerations

- Desired particle retention
- Pressure drop
- Flow rate
- Cleanliness requirements
- Operating fluid – type, density, viscosity
- Process temperature
- System pressure
- Corrosive effects, if any

Primary media considerations

In some cases, you may already know what type of Mott media is the best choice for your application. Standard products are designated by shape and media grade, but other characteristics may be altered to "fine tune" product performance:

- Mean pore size
- Density
- Pore size distribution

Manufacturing/assembly considerations

OEMs who wish to alter the shape or configurations of Mott products need to be aware of procedural limitations and guidelines to avoid compromising permeability. Listed here are basic considerations.

- ***Forming*** – Mott porous metal media has significant ductility, which allows cold forming within certain limits. For example, Mott standard 316L stainless steel, 1/16"- thick sheets can be roll formed into cylindrical filter elements with an outside diameter as small as 1¼". Smaller diameter tubes may be formed by using thinner sheets.
- ***Machining*** – Conventional machining will close surface pores, making the machined surface impermeable. It is possible, however, to keep surface pores open with electrical discharge machining (EDM) and subsequent cleaning. Mott provides these machining services. Ask our sales professionals for more information.

  If conventional machining is to be applied, Mott recommends using only water-soluble oils as lubricants. The machined components may subsequently be reactivated with a proprietary technique developed by Mott, performed at the factory. Customer-machined media may be returned to have this technique applied.
- ***Brazing*** – Brazing porous metal is extremely difficult. The porous metal tends to act as a wick, so when molten braze is applied, it is soaked up into the pores, filling them and destroying porosity. To avoid this effect, Mott has developed a special brazing technique which will be performed upon request.
- ***Welding*** – Mott sintered porous metal can be readily welded – to other porous and solid metal parts – as long as certain procedures are followed. Approximately 50% of porous metal consists of voids which tend to collapse under the heat of the welding arc. When this happens, additional metal must be added during the welding process to compensate for the reduced volume. This can be accomplished with a filler rod, or can be provided in the weld preparation of the mating solid component.

  Achieving optimal welds requires proper joint design. Our in-house weld shop has the experience and expertise to get the job done right. Contact us directly for more information on our services.

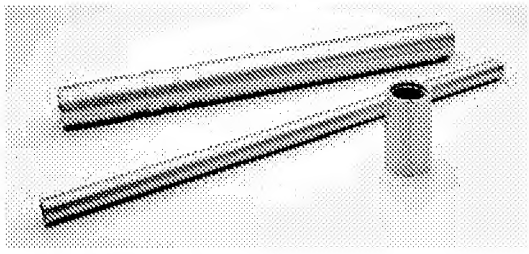
Cleaning considerations

Mott porous metal media can be cleaned for continuous reuse through a variety of techniques. The best method depends on the application – how the media is used, and what types of gases, liquids and particles are present. The following table shows some of the more common cleaning techniques.

Cleaning recommendations may be obtained by contacting Mott or visiting our website, **www.mottcorp.com**.

Application	Recommended cleaning method
Barrier filter (particulate retained on filter surface)	Reverse flush (clean fluid or gas)
Depth-type filter (particulate entrained within pores)	Ultrasonic cleaning (backflush with solvent first if particulate are nonreactive with the media)
Combustible contaminant	Salt bath at elevated temperature (use nitrogen blanket if bath temperature is >750°F)
Barrier and depth contaminant	Oven burning with steam blanket, followed by ultrasonic cleaning

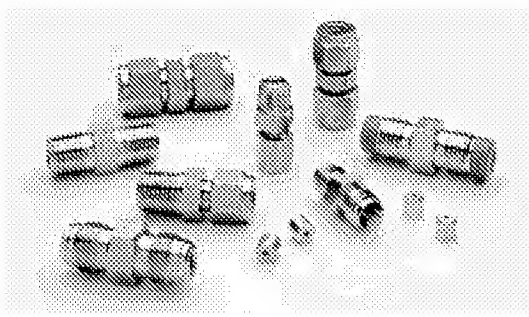
Designs for your application.



Air film rolls/air bearings.

Function: Guides surface-sensitive webs on a cushion of air during transport.

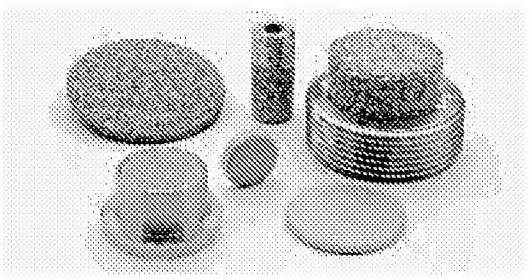
Application Examples: Photographic film; magnetic audio, video or computer tape; pressure-sensitive adhesive tape; metal foils; polyethylene films.



Flow restrictors.

Function: Provides laminar flow and precise control/regulation of gas or liquid flows.

Application Examples: Flow control of liquid drugs; gas mixing into beverages; safety devices on anesthesia machines; flow control in gas chromatographs, laminar flow elements, flow splitters, calibrated leaks.



Breathers/pressure equalizers.

Function: Relieves pressure, allows pressure equalization while excluding contaminants.

Application Examples: Vents, vent covers, tank vents, sound/speaker enclosures, mold vents, rate of rise pressure devices.
Note: Media can be treated to repel water while maintaining permeability.

Instrument filters.

Function: Protects critical instruments by providing maximum purity and optimal flow.

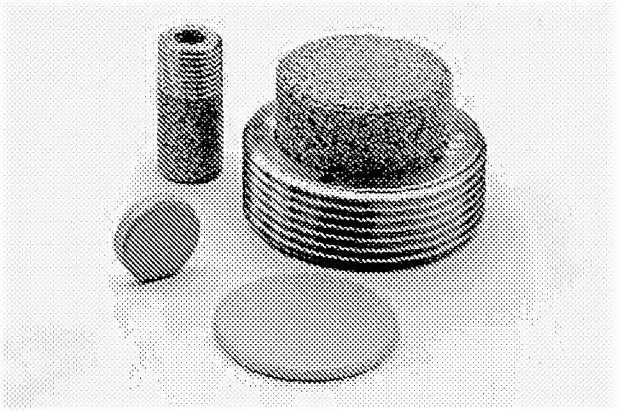
Application Examples: In-line filtration, chromatography solvents, protects HPLC pump inlet check valves from particulate.

Flame arrestors.

Function: Prevents flammable gases from burning back to supply source by quenching/cooling flame.

Application Examples: Welding torches, gas cabinets, gas analyzers, electrical enclosures, pressure regulators for flammable gases or oxygen service.

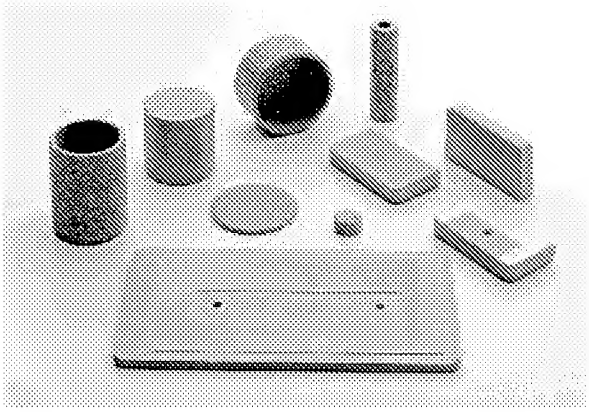
Designs for your application.



Silencers.

Function: Sound dampening/reduction.

Application Examples: Sound attenuation for pneumatic devices.



Wicks.

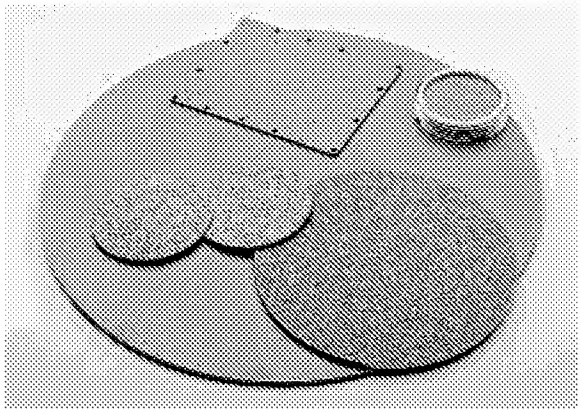
Function: Absorbs liquids for dispersion, removal or vaporization.

Application Examples: Ink adsorption plates, thermal management heat pipes, butane lighters.

Spargers.

Function: Distribution device for gas/liquid interfacing.

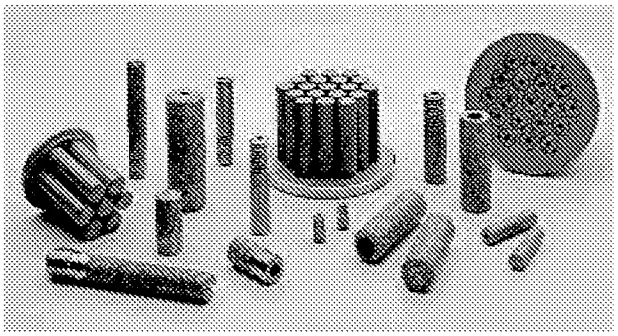
Application Examples: Aeration; bulking, carbonation, hydrogenation, oxidation, oxygen stripping ozone delivery.



Fluidizers.

Function: Uniformly disperses gas into particle bed.

Application Examples: Aeration, heat-treating powder hoppers to aid powder flow by preventing bridging.



Polymer filters.

Function: Removes cross-linked and gelled molecules which lead to filament breakage.

Application Examples: Nylon 6 and 6,6 production, polyethylene, rayon.

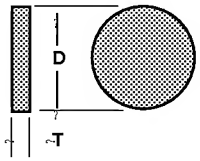
Basic shapes.

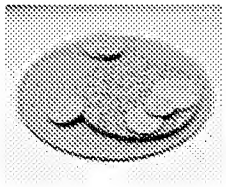
Standard shapes of Mott porous metal media offer an expedient, cost-effective means of satisfying application requirements.

NOTE: Tighter tolerances are available for all products shown. Please contact Mott to speak with our Sales Department if you have more exacting requirements.

For more information about these or other products call Mott at **1-800-BUY-MOTT (800-289-6688)**, **1-860-747-6333** or visit our website, **www.mottcorp.com**.

Discs Mott porous 316L SS discs, Series 1000.
Use part desc.1000-D-T-Media Grade.

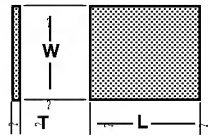


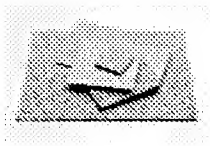


Discs	D, in. (standard tolerance)	T, in. (standard tolerance)
Smallest standard size	0.062 (±0.002)	0.039 (±0.005)
Largest standard size	1.000 (±0.008)	0.125 (±0.015)

Also available: discs from 0.020" to 8.375" in diameter.
Larger discs cut from porous metal sheets are also available.

Sheets Mott porous 316L SS sheet, Series 1100.
Use part desc. 1100-W-L-T-Media Grade.

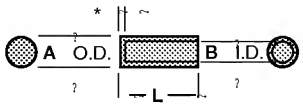




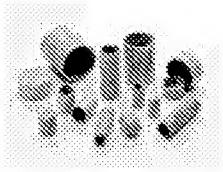
Sheets	W, in. (standard tolerance)	L, in. (standard tolerance)	T, in. (standard tolerance)
Smallest standard size	8.50 (+0.093/-0.062)	10.00 (+0.093/-0.062)	0.039*/0.062* 0.078*/0.093**
Largest standard size	10.00 (+0.093/-0.062)	12.00 (+0.093/-0.062)	0.125 (±0.010)

Other sizes and thicknesses are also available.
** = ± 0.005; ** = +0.015/-0.010*

Cups Mott porous 316L SS cups, Series 1200.
Use part desc. 1200-A-B-L-Media Grade.



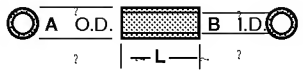
*Min. end thickness = wall thickness

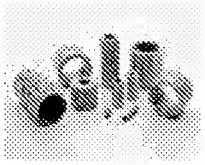


Cups	A, in. (standard tolerance)	B, in. (standard tolerance)	L, in. (standard tolerance)
Smallest standard size	0.125 (±0.005)	0.062 (±0.005)	0.125 (±0.015)
Largest standard size	0.812 (±0.015)	0.641 (±0.010)	1.060 (±0.015)

Also available: cups from 0.078" to 1.57" O.D.

Bushings Mott porous 316L SS bushings, Series 1300.
Use part desc. 1300-A-B-L-Media Grade.

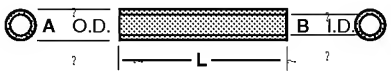


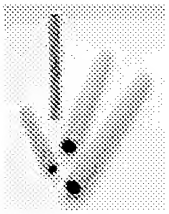


Bushings	A, in (standard tolerance)	B, in. (standard tolerance)	L, in. (standard tolerance)
Smallest standard size	0.250 (±0.005)	0.125 (±0.005)	1 (±0.015)
Largest standard size	0.375 (±0.005)	0.250 (±0.005)	1 (±0.015)

Also available: bushings from 0.138" to 18" O.D.

Seamless Tubes Mott porous 316L SS seamless tubing, Series 1400.
Use part desc. 1400-A-B-L-Media Grade.





Seamless Tubes	A, in. (standard tolerance)*	B, in. (standard tolerance)	L, in. (standard tolerance)**
Smallest standard size	0.250 (+0.012/-0.002)	0.125 (nom.)	6 (+0.125/-0.000)
Largest standard size	1.000 (+0.050/-0.010)	0.750 (nom.)	24 (+0.125/-0.000)

Standard tube lengths: 6", 12", 18", 24".
Other tube lengths, diameters and sizes available - consult factory.
** 0.250" OD in 6" length only.*
*** ±0.015 tolerance is also available – consult factory.*

Key: D=Diameter, T=Thickness, W=Width, L=Length, A=Outside Diameter, B=Inside Diameter

Permeability – A measured liquid or gas flow for a given pressure drop.

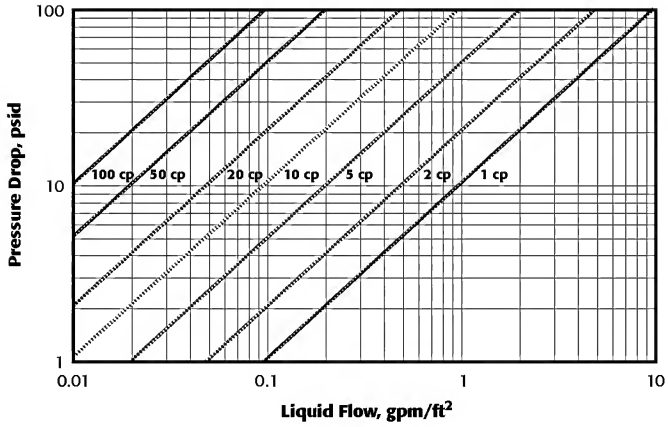
316L SS Rolled Sheet

The flow curves on these pages are presented as a design aid for application development using Mott porous metal sheet media. The data is not necessarily representative of Mott's pressed parts. The air flow graph has data for all media grades determined under ambient conditions. Flow data for water and higher viscosity liquids are given in the other graphs for our standard media grades.

Media Grade: 0.1 Thickness: 0.039 inches

Material Specifications
Bubble Point, in. of Hg: 7.0 - 9.0
Min Tensile Strength, kpsi: 34.0
Yield Strength, kpsi: 32.0
Young's Modulus, x 10^6 psi: 17.0

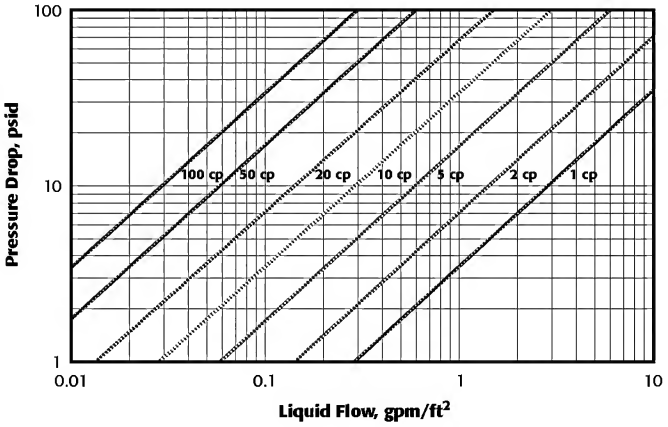
Permeability Coefficient
Liquid, K_L: 270
Gas, K_G: 1900



Media Grade: 0.2 Thickness: 0.039 inches

Material Specifications
Bubble Point, in. of Hg: 5.0 - 6.9
Min Tensile Strength, kpsi: 26.0
Yield Strength, kpsi: 24.0
Young's Modulus, x 10^6 psi: 13.2

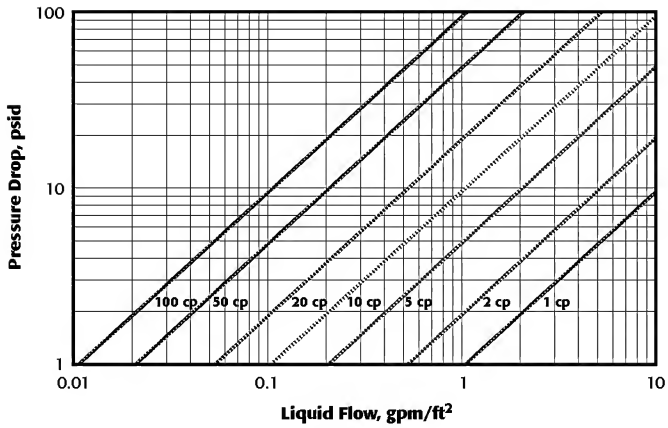
Permeability Coefficient
Liquid, K_L: 90
Gas, K_G: 700



Media Grade: 0.5 Thickness: 0.047 inches

Material Specifications
Bubble Point, in. of Hg: 3.0 - 3.9
Min Tensile Strength, kpsi: 21.0
Yield Strength, kpsi: 19.0
Young's Modulus, x 10^6 psi: 9.5

Permeability Coefficient
Liquid, K_L: 20
Gas, K_G: 190



Notes to flow graphs.

1. Differential pressure varies in direct proportion to sheet thickness. Standard sheet thickness varies with media grade.
2. Flow curves are presented in a log-log format; be sure to note the correct numerical values for each log cycle.
3. Flow characteristics given are for porous media only. To determine total pressure drop of a system, combine losses through media, fittings, housing, piping and valves as appropriate.
4. These flow characteristics were derived using 316L SS porous media.
5. These flow characteristics are typical and should be used for general reference only.
6. Tests run at 70°F with water, other curves generated using calculated formulas.

Liquid: Pressure Drop, psid = (K_L)(Flux, gpm/ft²)(Visc, cp)(Thck, in.)
Gas: Pressure Drop, psid = (K_G)(Flux, acfm/ft²)(Visc, cp)(Thck, in.)

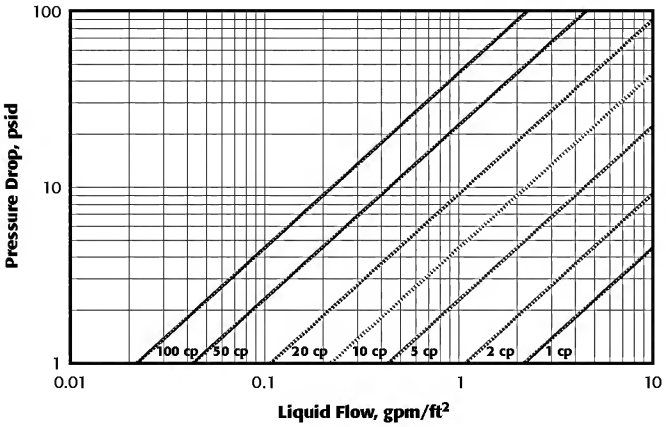
Permeability information.

316L SS Rolled Sheet (cont'd).

Media Grade: 1 Thickness: 0.047 inches

Material Specifications
Bubble Point, in. of Hg: 2.0 - 2.5
Min Tensile Strength, kpsi: 17.0
Yield Strength, kpsi: 15.0
Young's Modulus, x 10^6 psi: 7.4

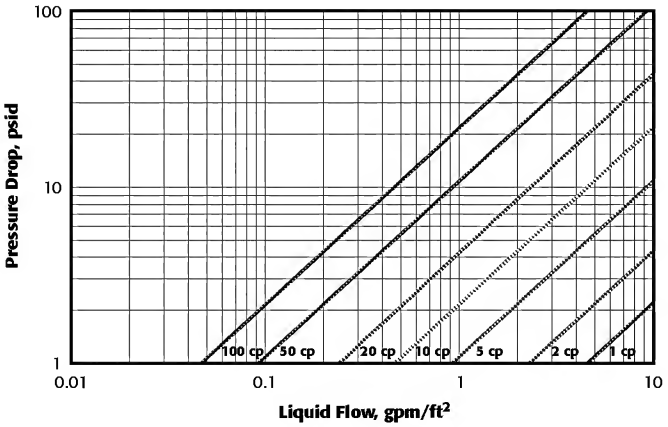
Permeability Coefficient
Liquid, K_L: 9.2
Gas, K_G: 75



Media Grade: 2 Thickness: 0.062 inches

Material Specifications
Bubble Point, in. water: 17.0 - 24.0
Min Tensile Strength, kpsi: 13.2
Yield Strength, kpsi: 10.8
Young's Modulus, x 10^6 psi: 5.7

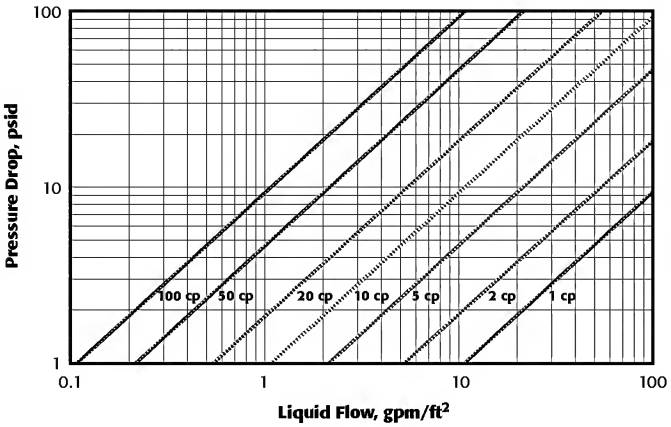
Permeability Coefficient
Liquid, K_L: 3.5
Gas, K_G: 30



Media Grade: 5 Thickness: 0.062 inches

Material Specifications
Bubble Point, in. water: 13.0 - 16.9
Min Tensile Strength, kpsi: 9.2
Yield Strength, kpsi: 8.5
Young's Modulus, x 10^6 psi: 4.1

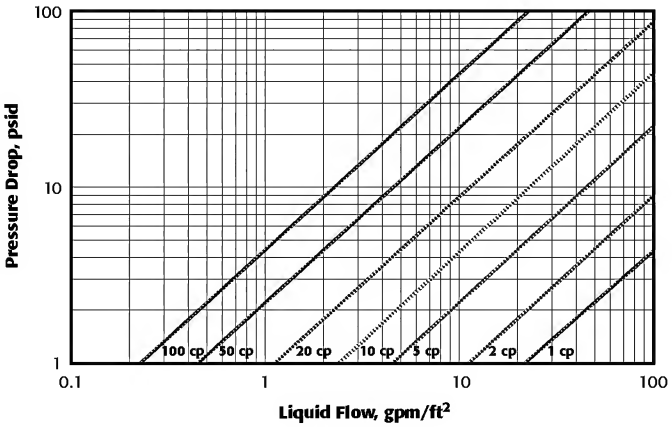
Permeability Coefficient
Liquid, K_L: 1.5
Gas, K_G: 15



Media Grade: 10 Thickness: 0.062 inches

Material Specifications
Bubble Point, in. water: 7.5 - 10.9
Min Tensile Strength, kpsi: 7.5
Yield Strength, kpsi: 6.0
Young's Modulus, x 10^6 psi: 3.2

Permeability Coefficient
Liquid, K_L: 0.7
Gas, K_G: 7.0



Note: Tests run at 70°F with water, other curves generated using calculated formulas.

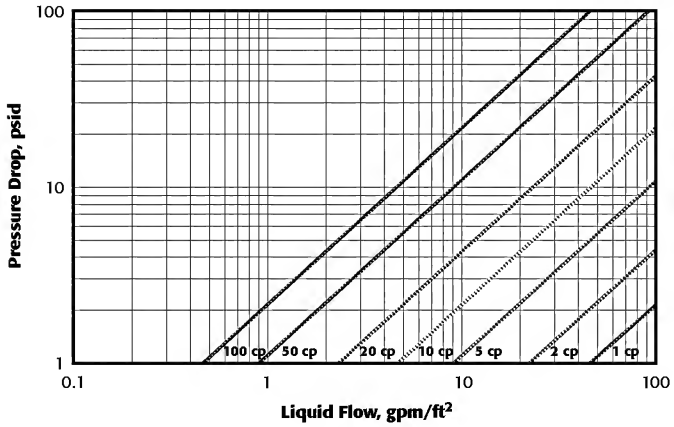
Permeability information.

316L SS Rolled Sheet (cont'd).

Media Grade: 20 Thickness: 0.062 inches

Material Specifications
Bubble Point, in. water: 4.5 - 7.0
Min Tensile Strength, kpsi: 5.7
Yield Strength, kpsi: 5.0
Young's Modulus, x 10^6 psi: 2.5

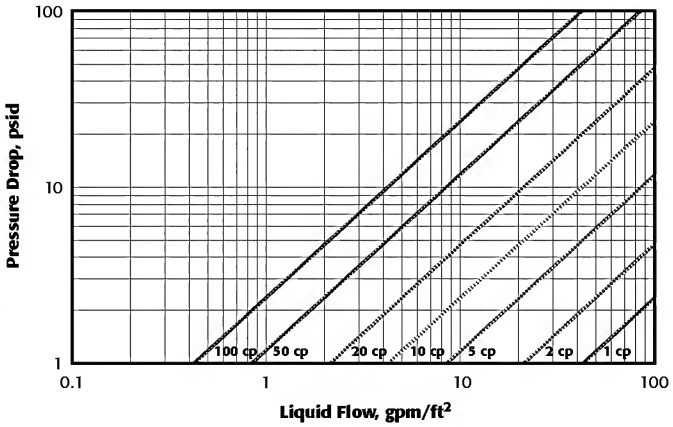
Permeability Coefficient
Liquid, K_L: 0.35
Gas, K_G: 4.7



Media Grade: 40 Thickness: 0.078 inches

Material Specifications
Bubble Point, in. water: 2.5 - 4.0
Min Tensile Strength, kpsi: 4.0
Yield Strength, kpsi: 3.5
Young's Modulus, x 10^6 psi: 1.9

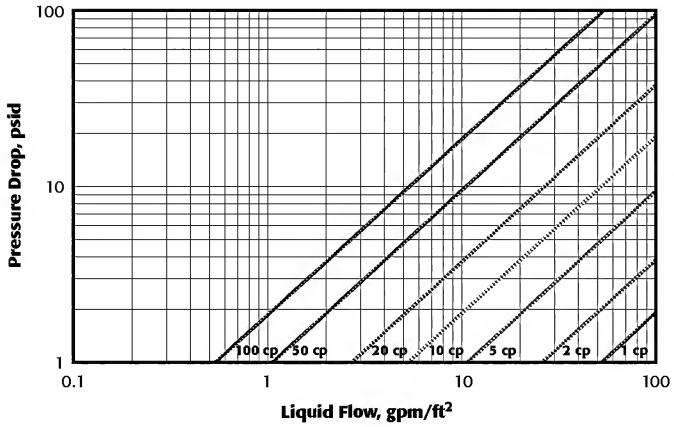
Permeability Coefficient
Liquid, K_L: 0.30
Gas, K_G: 2.9



Media Grade: 100 Thickness: 0.093 inches

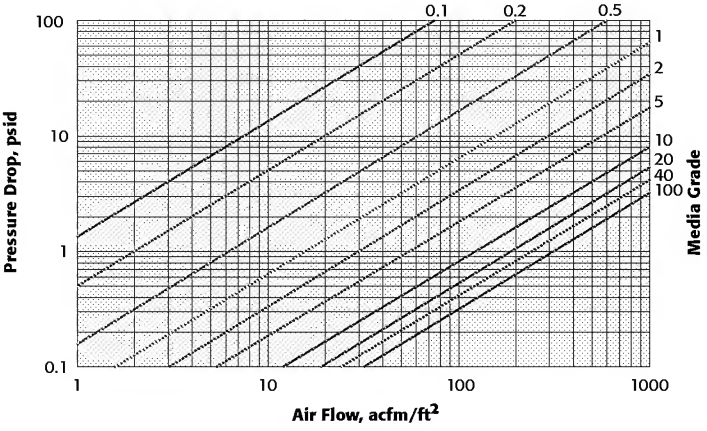
Material Specifications
Bubble Point, in. water: 0.5 - 1.5
Min Tensile Strength, kpsi: 1.3
Yield Strength, kpsi: 1.0
Young's Modulus, x 10^6 psi: 1.4

Permeability Coefficient
Liquid, K_L: 0.20
Gas, K_G: 1.9



Air Flow for Media Grades 0.1 - 100

Note: Rolled sheet samples are of standard thickness

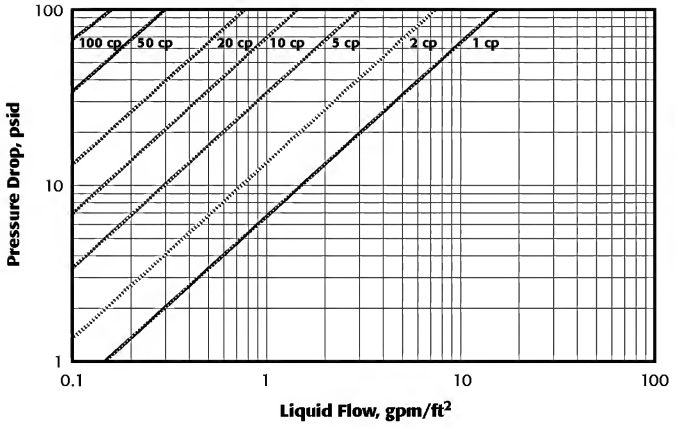


Note: Tests run at 70°F with water, other curves generated using calculated formulas.

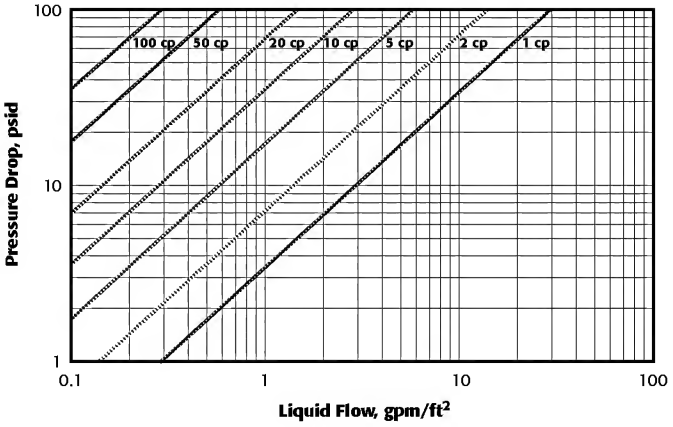
Permeability information.

316L SS Seamless Tubes.

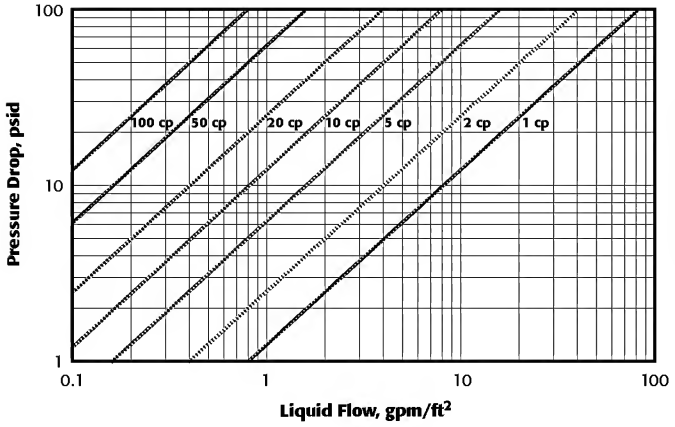
Media Grade: 0.1
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. of Hg: 7.0 - 9.0
Min Tensile Strength, kpsi: 30.6
Yield Strength, kpsi: 28.8
Young's Modulus, x 10^6 psi: 14.7
Permeability Coefficient
Liquid, K_L: 110
Gas, K_G: 1000



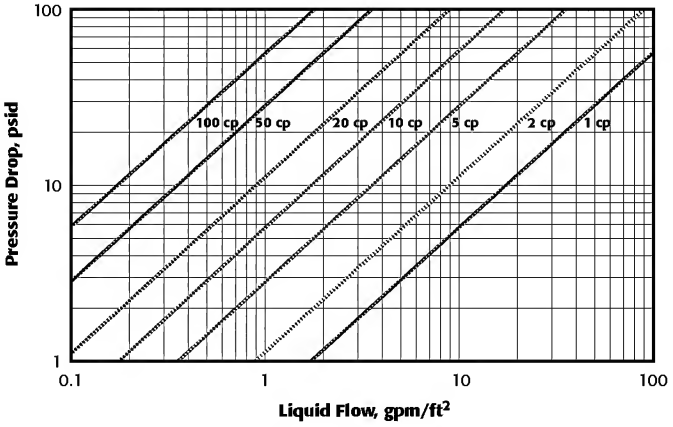
Media Grade: 0.2
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. of Hg: 5.0 - 6.9
Min Tensile Strength, kpsi: 23.4
Yield Strength, kpsi: 21.6
Young's Modulus, x 10^6 psi: 11.5
Permeability Coefficient
Liquid, K_L: 57
Gas, K_G: 620



Media Grade: 0.5
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. of Hg: 3.0 - 3.9
Min Tensile Strength, kpsi: 18.9
Yield Strength, kpsi: 17.1
Young's Modulus, x 10^6 psi: 8.3
Permeability Coefficient
Liquid, K_L: 20
Gas, K_G: 154



Media Grade: 1
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. of Hg: 2.0 - 2.5
Min Tensile Strength, kpsi: 15.3
Yield Strength, kpsi: 13.5
Young's Modulus, x 10^6 psi: 6.5
Permeability Coefficient
Liquid, K_L: 9.2
Gas, K_G: 60

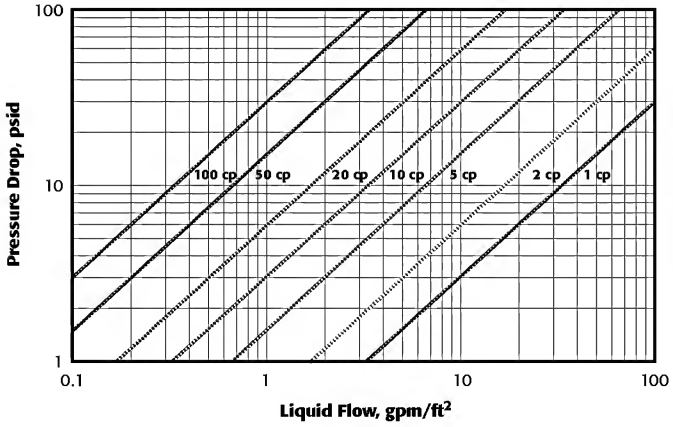


Note: Tests run at 70°F with water, other curves generated using calculated formulas.

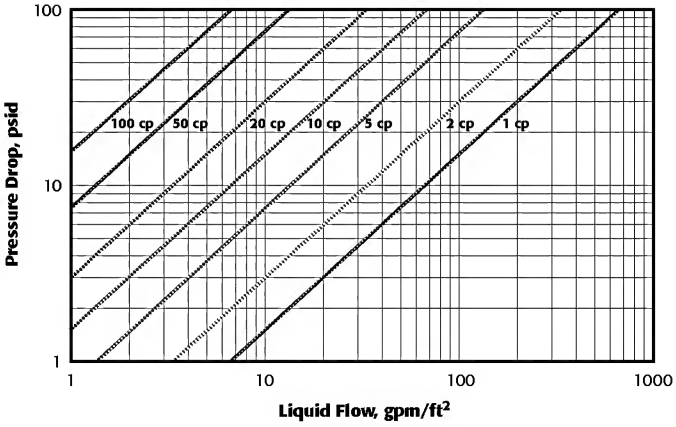
Permeability information.

316L SS Seamless Tubes (cont'd).

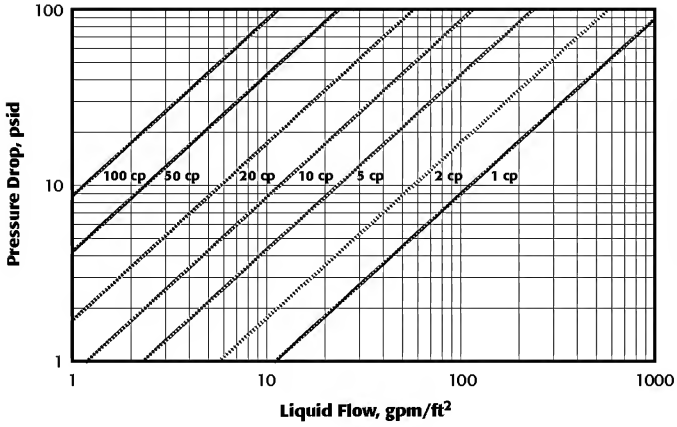
Media Grade: 2
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 17.0 - 24.0
Min Tensile Strength, kpsi: 11.9
Yield Strength, kpsi: 10.9
Young's Modulus, x 10^6 psi: 5.1
Permeability Coefficient
Liquid, K_L: 4.9
Gas, K_G: 33



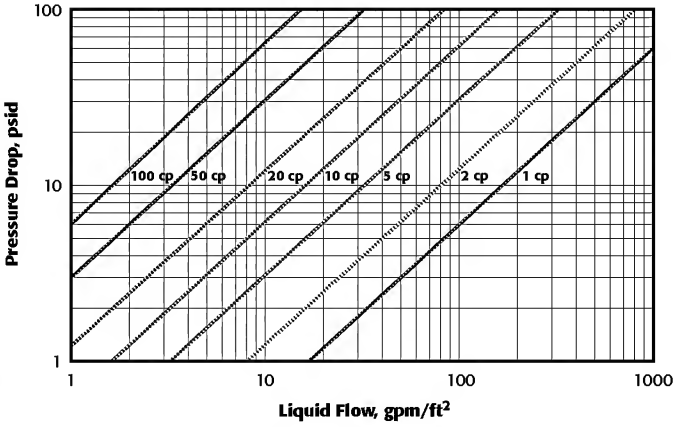
Media Grade: 5
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 13.0 - 16.9
Min Tensile Strength, kpsi: 8.3
Yield Strength, kpsi: 7.6
Young's Modulus, x 10^6 psi: 3.7
Permeability Coefficient
Liquid, K_L: 2.4
Gas, K_G: 11



Media Grade: 10
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 7.5 - 10.9
Min Tensile Strength, kpsi: 6.7
Yield Strength, kpsi: 5.4
Young's Modulus, x 10^6 psi: 2.9
Permeability Coefficient
Liquid, K_L: 1.4
Gas, K_G: 5.3



Media Grade: 20
Inside Diameter: 0.375 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 5.0 - 7.0
Min Tensile Strength, kpsi: 5.1
Yield Strength, kpsi: 4.5
Young's Modulus, x 10^6 psi: 2.3
Permeability Coefficient
Liquid, K_L: 1.0
Gas, K_G: 4.6

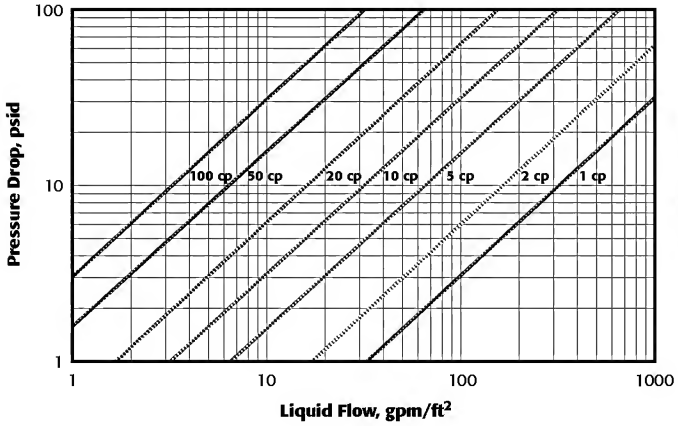


Note: Tests run at 70°F with water, other curves generated using calculated formulas.

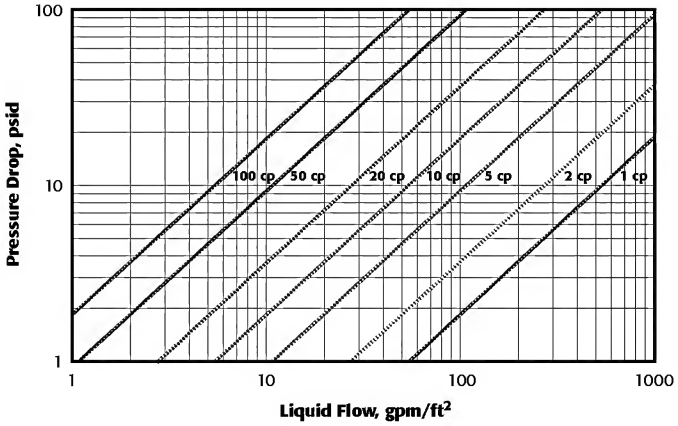
Permeability information.

316L SS Seamless Tubes (cont'd).

Media Grade: 40
Inside Diameter: 0.344 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 3.0 - 4.0
Min Tensile Strength, kpsi: 3.6
Yield Strength, kpsi: 3.1
Young's Modulus, x 10^6 psi: 1.8
Permeability Coefficient
Liquid, K_L: 0.40
Gas, K_G: 2.6

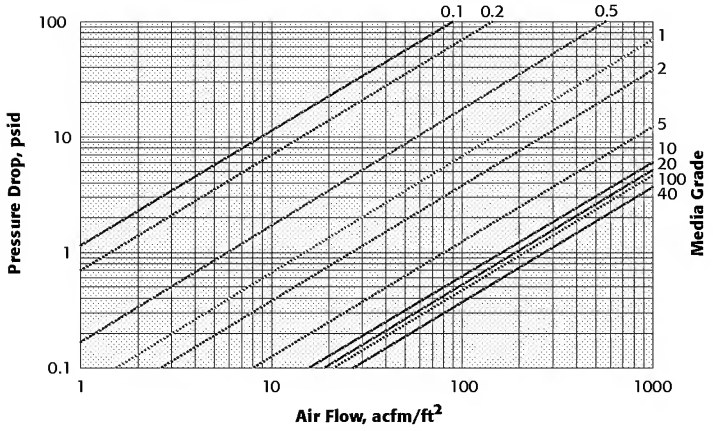


Media Grade: 100
Inside Diameter: 0.314 inches
Outside Diameter: 0.500 inches
Material Specifications
Bubble Point, in. water: 0.5 - 1.5
Min Tensile Strength, kpsi: 1.2
Yield Strength, kpsi: 0.9
Young's Modulus, x 10^6 psi: 1.3
Permeability Coefficient
Liquid, K_L: 0.20
Gas, K_G: 2.8



Air Flow for Media Grades 0.1 - 100

Note: Seamless Tube samples are standard in thickness



Note: Tests run at 70°F with water, other curves generated using calculated formulas.

Particle Capture Efficiency In Liquid

Media Grade	Thickness	Particle Size - µm Initial Collection Efficiency 90%	99%	99.9%
0.1	0.039"	0.15	0.4	0.8
0.2	0.039"	0.5	0.9	1.4
0.5	0.047"	1	1.7	2.2
1	0.047"	1.5	2.2	3.3
2	0.062"	4	5.5	9
5	0.062"	5	8	13
10	0.062"	10	15	20
20	0.062"	20	25	35
40	0.078"	25	35	45
100	0.093"	50	100	150

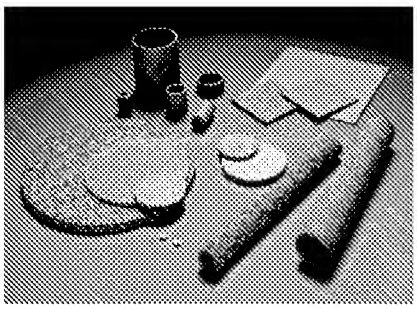
Testing performed per ASTM F795
Tested at 1 gpm/ft^2
ISO A2 or A3 test dust suspended in water

Particle Capture Efficiency In Gas

Media Grade	Thickness	Particle Size - µm Initial Collection Efficiency 90%	99%	99.9%
HIGH PURITY	---	D	D	D
0.1	0.039"	C	C	C
0.2	0.039"	A	B	0.2
0.5	0.047"	A	0.25	0.3
1	0.047"	A	0.35	0.7
2	0.062"	0.3	0.6	2
5	0.062"	0.8	2	5
10	0.062"	4.5	8	13
20	0.062"	8	12	20
40	0.078"	12	25	45
100	0.093"	20	40	100

Tested at flux of 6 acfm/ft^2
A = Initial efficiency is greater than 90% for all particle sizes
B = Initial efficiency is greater than 99% for all particle sizes
C = Initial efficiency is greater than 99.9% for all particle sizes
D = Initial efficiency is greater than 99.9999999% for all particle sizes

From porous media to complete filters, Mott delivers what you need.

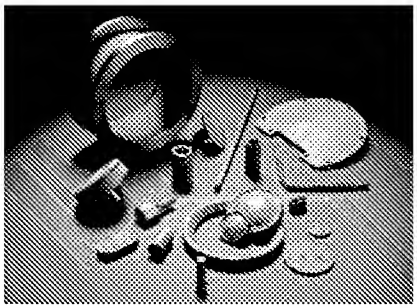


Common Configurations.

Discs, sheets, cups, bushings and tubes for use in OEM products, filter assemblies, etc.

Unique solutions.

Mott takes the basic media one step further by incorporating porous structures into filter elements and cartridges, air rolls and vacuum rolls, snubbers, silencers, restrictors, instrument filters, inertial filters and components for melt polymer spinning.

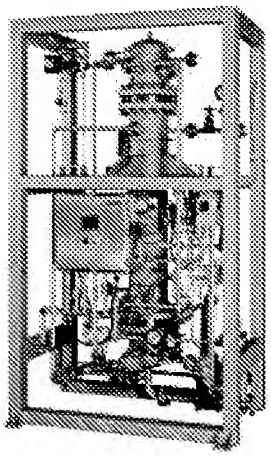


HyPulse® filters.

For even greater convenience, Mott can provide porous filter elements complete with housings and fittings. We help you select proper sizes, inlet and outlet connections, materials for wetted parts and other features for high-efficiency filtration.

HyPulse filtration systems.

Mott HyPulse filters provide exceptional performance in many liquid/solids and gas/solids separation applications. Catalyst recovery, liquid clarification, calciner offgas and injection well protection are just a few applications where HyPulse filters are working today.



Typical applications of Mott precision porous metal products.

Mott can be your Solution Provider.

This applications list is a quick review of the varied uses that have been developed for Mott precision porous metal products. Use this list as a handy reference, coupled with the unique design properties of porous media, to see how Mott products can solve problems for you.

Mott engineers can develop new ideas for product design or product and process improvement, using porous media in imaginative ways. Their experience in this field, backed by a commitment to technical service, provides the specialized help you need. Put Mott to the test – ask for an application analysis or design review.

Filtration Applications.

Chemical/Petrochemical

- Corrosive liquids, gases
- Air, nitrogen, carbon dioxide, argon, helium, ammonia
- Process steam
- Oxygen (filters cleaned and certified for O_2 service)
- Solvents, ketones, esters, amines, liquid hydrocarbons, polymers
- Feedwater and makeup water
- High-temperature liquids, gases
- High-pressure ethylene gas
- Cryogenic fluids
- Ethylene glycol
- Catalyst retention, fluid bed reactors
- Catalyst recovery, slurry phase reactors
- High-efficiency solids recovery or liquid cycling

Food/Beverage

- Process steam filtration
- Catalyst recovery from hydrogenation reactors
- Polishing of syrups, liquors and other liquids
- Carbon removal for decolorization operations
- Bleaching clay filtration

Medical/Pharmaceutical

- Liquid drug delivery
- Fluid cooling filters
- Oxygenation for bioreactors/fermentors
- Flow control/safety devices for medical equipment

Electronics

- Filtration of oxide slurries for magnetic tapes
- Filtration of ink for high-speed printers

Instrumentation

- In-line filtration
- Chromatography solvents
- HPLC pump inlet check valve protection

Textile

- Nylon 6 and 6,6 production
- Polyethylene
- Rayon

Refinery

- Filtration of FCCU Slurry Oil

Energy

- Porous metal septa for powered resin filter/demineralizers
- Condensate polishing

Other Applications.

Gas-liquid contacting/sparging

- Carbonation
- Oxygenation
- Aeration
- Hydrogenation
- Dewatering oil

Nitrogen sparging

- Deoxidizing wines and other liquids
- Bulking mayonnaise and similar products

Chromatography column frits

Flame arrestors for instruments and analyzers

Breathers and vents

Wicks

Flow restrictors

Pressure snubbers

Fluidization

Vacuum lance for deaerating powders

Air platens for transport or support

Gas diffusion

Silencers

Fuel Cell Applications

Thermal Management

Established in 1959, Mott Corporation coordinates engineering, sales, service and manufacturing from two adjacent facilities totalling 90,000 square feet. Mott's skilled workforce, along with strategically located overseas affiliates, services thousands of customers all over the world, in virtually every major segment of industry.

Need a product? Need advice?

Call us either way. Whether you need a stock solution, a customized design, or simply guidance, we welcome your call. Contact the experts at Mott Corporation today.

mott *corporation*

84 Spring Lane, Farmington, CT 06032-3159
www.mottcorp.com, email: quest@mottcorp.com
860-747-6333 Fax 860-747-6739

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